THE 'MANIHINE' EXPEDITION TO THE GULF OF AQABA

I. FOREWORD: STATION LIST AND COLLECTORS' NOTES

DURING the winter of 1948–1949 the motor-yacht *Manihine* was engaged in biological investigations in the Gulf of Aqaba on behalf of the British Museum (Natural History), the work being under the supervision of Mr. N. B. Marshall.

This gulf is of special interest because in it the peculiarities of the Red Sea appear at their most intense. The Red Sea is geologically young with a fauna derived from that of the Arabian Sea and, possibly, the Mediterranean. This immigrant fauna is now completely isolated from the last-mentioned and also partially isolated from the former by reason of the narrowness and shallowness of the connecting passage, the Strait of Bab-el Mandeb. It also finds itself in a region where some, at least, of the ecological conditions are very different. The most noticeable of these ecological differences is to be found in the isohaline and isothermal nature of the water below 200 metres and the complete absence of any cold, deep-water layer. The John Murray Expedition (Seymour Sewell, 1935, *John Murray Exp., Reports*, **1**, 1) recorded temperatures from 21·64 to 21·84° C. at depths of 1,000 to 1,900 metres in the Red Sea, but at similar depths in the Gulf of Aden the temperature was at least 10° C. lower (3·59–11·53° C.). The degree of isolation of the Aqaba fauna is greater than that of any other part of the Red Sea since the passage between the two, the Strait of Tiran, provides only a restricted channel for faunal interchange. The strait is both narrow and shallow, forming a distinct sill, with a greatest depth of less than about 300 metres; on either side of the sill the water deepens rapidly to 1,000 metres and upwards. The hydrological conditions inside the gulf appear to be essentially similar to those in the Red Sea proper, though, as might be expected, salinities are somewhat higher.

In this Bulletin are reports on some of the collections that were brought back. Other reports, including a study of the interchange of heat and water vapour between the surface water and the air, will be prepared as opportunities offer, but in some instances the collections will be studied in conjunction with other material and will not form the subject of a special report.

Acknowledgements and thanks are due to many individuals and institutions whose material aid or advice contributed greatly to the expedition. Foremost among them is Major H. W. Hall, O.B.E., M.C., who not only provided the ship and was responsible for most of the preliminary organization, but who, with Mrs. Hall, accompanied the expedition taking a large share of the actual collecting and doing most of the photography. A small selection of the photographs is published here to give a general impression of the gulf and its surroundings. Many localities could not have been visited but for the skilful pilotage of Captain Hargreaves through poorly charted

waters, and to him, and to his hard-working crew, all possible thanks are due. The Hydrographer of the Navy and the Director of 'Discovery Investigations' lent apparatus vital to the expedition and His Excellency the Egyptian Ambassador in London made arrangements that ensured pleasant and harmonious relations wherever the ship was in Egyptian waters. Lastly, thanks are due to the Government Chemist, whose department carried out the analyses of salinities.

Except for the plankton and some of the fishes all material was obtained from littoral areas and coral reefs (or coral patches). Localities where collections were made are indicated on the chart. Within the Gulf of Aqaba (reading from north to south) these were:

Aqaba (Pl. 22, fig. 1)
Faraun Island (Pl. 22, fig. 2)
Graa
Mualla (Pl. 23, fig. 3)
Hobeik (Pl. 23, fig. 4)
Dahab (Pl. 24, fig. 5)
Um Nageila (Pl. 24, fig. 6)
Abu Zabad

Along the Sinai shores there are well-formed coral reefs at Dahab and from Um Nageila southwards. The bulk of the invertebrate material was obtained from these regions, particularly from Abu Zabad on the 10th and 11th February 1949 when there were low spring tides. North of Dahab there were coral patches at all localities visited, but these never become massed to form a definite reef.

Outside the gulf collections were made at the following localities:

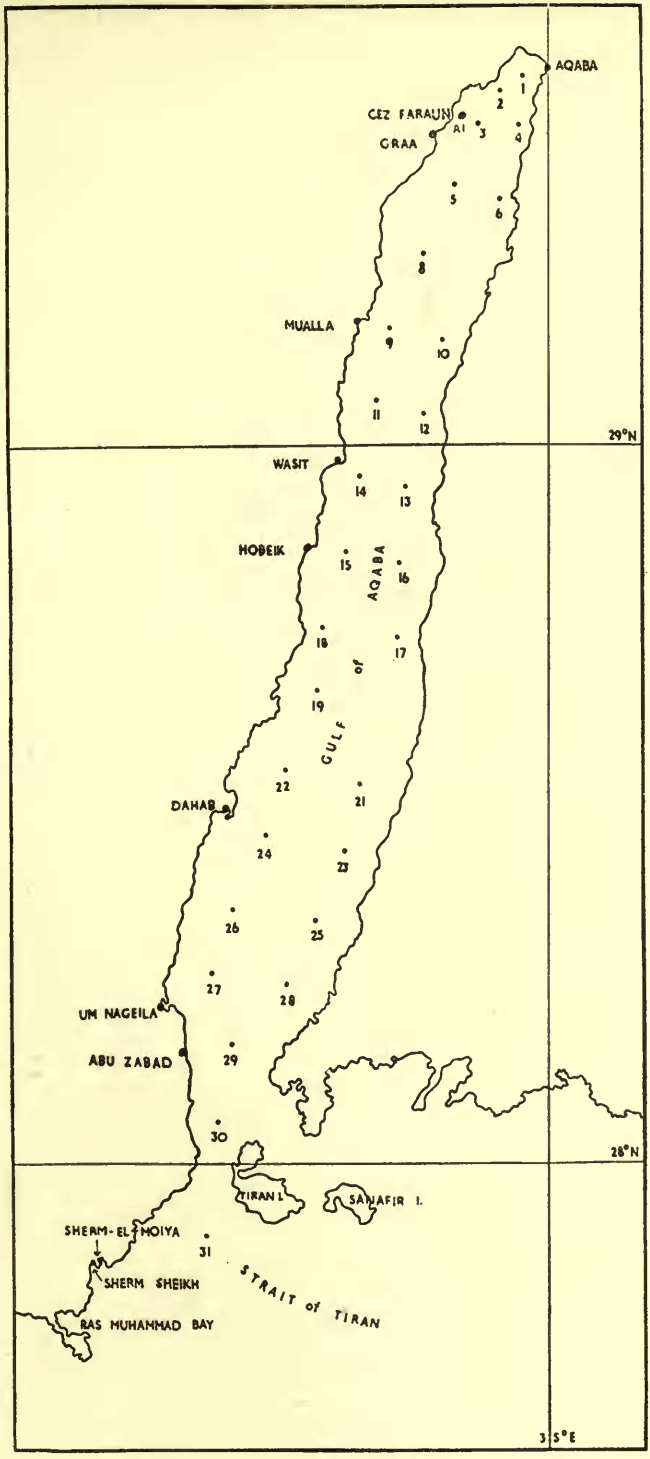
Sanafir Island (Pl. 25, fig. 7)
Tiran Island (Pl. 25, fig. 8)
Sherm Sheikh
Sherm-el-Moiya (Pl. 26, fig. 9)
Ras Muhammad Bay (Pl. 26, fig. 10)

Most time was spent on Sanafir Island, where there were well-formed coral reefs. Here, as elsewhere, much material was collected by diving for pieces of coral and extracting the small invertebrates and fishes.

It will be observed that in the Station List no temperatures are given for depths below 40 metres. It was, however, established that at all stations where deep-water samples were taken (i.e. where salinity figures are given in the list) the temperature exceeded 18·5° C.

The following are the meanings of the abbreviations used in the list.

D.M. = Dredge, medium.
D.S. = Dredge, small.
K.T. = Kelvin tube.
N. 70 V. = Vertical haul by silk plankton net with mouth 70 cm. diameter.
N. 100 V. = Vertical haul with stramin plankton net with mouth 100 cm. diameter.
O.T.L. = Otter trawl, large.



The Gulf of Aqaba.

The positions of the numbered stations are given in the station list.

Station	Position	Date	Hour L.M.T.	Sounding (metres)	Wind		Barometer (inches)	Hydrological obs.			Bathythermograph obs.		Biological observations				Remarks
					Direction	Force		Depth (metres)	Temp. °C.	S‰	Depth (metres)	Temp. °C.	Gear	Depth (metres)	Time From	Time To	
A 1	29° 26′ 30″ N.	1948	1140–	40	N.	3	29·8	0	22·1	40·8	—	—	D.M.	40	1155	1200	No catch: net torn off.
	34° 51′ 30″ E.	31.xii	1237										D.S.	40	1227	1231	No catch.
													N. 100 V.	36	1215	1225	K.T.
1	29° 30′ 54″ N.	1949	1300–	356	S.	1	29·55	0	21·59	40·79	0	21·4	N. 100 V.	*c.* 180	1340	1355	
	34° 57′ 30″ E.	15.i	1415					137	—	40·78	40	20·8					
								274	—	40·38							
2	29° 29′ 54″ N.	15.i	1435–	165	S.	1	29·55	0	21·65	40·78	0	21·3	N. 100 V.	73	1440	1455	K.T.
	34° 55′ 30″ E.		1500					137	—	40·71	40	20·8					
3	29° 27′ 00″ N.	15.i	1515–	289	S.	1	29·5	0	21·61	40·77	0	21·3	N. 100 V.	79	1550	1600	K.T.
	34° 53′ 36″ E.		1555					137	—	40·67	40	20·9					
								219	—	40·8							
4	29° 26′ 6″ N.	15.i	1625–	713	S.	1	29·55	0	21·62	40·78	0	21·3	N. 100 V.	—	—	—	Net lost.
	34° 57′ 18″ E.		1655					274	—	—	40	21·0					
								549	—	40·72							
5	29° 21′ 36″ N.	16.i	1150–	642	SW.	2	29·35	0	21·61	40·72	0	21·1	N. 70 V.	*c.* 140	1255	1310	
	34° 51′ 12″ E.		1410					137	—	40·68	40	20·8					
								274	—	40·8							
6	29° 20′ 18″ N.	16.i	1010–	697	SW.	2	29·35	0	21·56	40·74	0	21·1	N. 70 V.	*c.* 140	1105	1115	
	34° 55′ 24″ E.		1115					137	—	40·8	42	20·8					
								274	—	40·79							
8	29° 15′ 42″ N.	16.i	1350–	274	SW.	1	29·35	0	21·72	40·79	0	21·1	N. 70 V.	*c.* 140	1422	1435	
	34° 47′ 42″ E.		1440								42	20·8					
9	29° 09′ 24″ N.	16.i	1455–	830	SW.	1	29·35	0	21·57	40·75	0	21·2	N. 70 V.	*c.* 140	1515	1527	
	34° 45′ 24″ E.		1540					274	—	40·79	42	20·8					
								548	—	40·66							
10	29° 08′ 30″ N.	17.i	0845–	914	SW.	1	29·3	0	21·38	40·8	0	21·1	N. 70 V.	*c.* 180	0940	1000	
	34° 50′ 00″ E.		1000					274	—	40·72	42	20·7					
								731	—	40·68							
11	29° 03′ 36″ N.	17.i	1105–	293	SW.	1	29·3	0	21·51	40·76	0	21·1	N. 70 V.	*c.* 140	1113	1125	
	34° 43′ 00″ E.		1125								40	20·8					
12	29° 02′ 00″ N.	17.i	1015–	805	SW.	1	29·3	0	21·53	40·77	0	21·1	N. 70 V.	*c.* 180	1025	1045	
	34° 48′ 30″ E.		1045								42	20·8					
13	28° 56′ 12″ N.	17.i	1240–	1019	SW.	2	29·4	0	22·0	40·74	0	21·3	N. 70 V.	*c.* 140	1309	1325	
	34° 46′ 42″ E.		1330								40	20·7					

14	28° 57′ 00″ N. 34° 42′ 30″ E.	17.i	1145– 1215	503	SW.	1	29·3	0 137 274	21·63 — —	40·73 40·75 40·74	0 42	21·0 20·7	N. 70 V.	*c.* 180	1158	1215	
15	28° 50′ 48″ N. 34° 41′ 24″ E.	18.i	0930– 1000	598	S.	1	29·55	0	21·35	40·71	0 42	21·2 20·7	N. 70 V.	*c.* 180	0940	1000	
16	28° 49′ 54″ N. 34° 46′ 06″ E.	18.i	1025– 1110	>1500	S.	1	29·55	0	21·74	40·70	0 42	21·1 20·8	N. 70 V.	*c.* 180	1035	1110	
17	28° 43′ 36″ N. 34° 45′ 26″ E.	18.i	1150– 1220	—	S.	1	29·55	0 137 274	21·88 — —	40·63 40·71 40·73	0 42	21·4 21·0	N. 70 V.	*c.* 180	1200	1220	
18	28° 44′ 30″ N. 34° 38′ 24″ E.	18.i	1310– 1415	942	S.	1	29·55	0	21·57	40·78	0 42	21·1 20·7	N. 70 V.	*c.* 180	1348	1415	
19	28° 39′ 06″ N. 34° 38′ 00″ E.	18.i	1430– 1530	>1460	S.	1	29·5	0 137 820	21·58 — —	40·78 40·74 40·66	0 40	21·2 20·7	N. 70 V.	*c.* 180	1505	1530	
21	28° 31′ 30″ N. 34° 42′ 18″ E.	19.i	1120– 1200	—	NW.	2	29·65	0 137 550	21·56 — —	40·70 40·74 40·64	0 40	21·1 20·8	N. 70 V.	*c.* 180	1145	1200	
22	28° 32′ 48″ N. 34° 35′ 00″ E.	19.i	1000– 1040	—	NW.	2	29·65	0 137 550	21·22 — —	40·76 40·72 40·67	0 40	21·1 20·8	N. 70 V.	*c.* 180	1009	1040	
23	28° 25′ 36″ N. 34° 40′ 54″ E.	19.i	1230– 1300	—	NW.	2	29·65	0	21·81	40·53	0 40	21·5 20·9	N. 70 V.	*c.* 180	1240	1300	
24	28° 27′ 12″ N. 34° 33′ 20″ E.	19.i	0900– 0930	850	NW.	2	29·65	0	21·20	40·75	0 33	20·9 20·7	N. 70 V.	*c.* 180	0909	0930	
25	28° 20′ 12″ N. 34° 38′ 12″ E.	19.i	1400– 1430	—	N.	2	29·6	0	22·20	40·61	0 26	21·7 21·3	N. 70 V.	*c.* 180	1410	1430	
26	28° 20′ 54″ N. 34° 30′ 18″ E.	20.i	0900– 0920	—	N.	3	29·65	0	21·40	40·70	0 33	21·2 21·0	N. 70 V.	*c.* 180	0903	0920	
27	28° 15′ 42″ N. 34° 28′ 00″ E.	20.i	0950– 1045	—	N.	3	29·65	0 137 550	21·45 — —	40·59 40·66 40·66	0 38	21·4 21·1	N. 70 V.	*c.* 180	1020	1045	
28	28° 14′ 36″ N. 34° 35′ 12″ E.	20.i	1125– 1210	—	NNE.	4	29·6	0 137 460	21·44 — —	40·66 40·66 40·66	0 35	21·3 21·0	N. 70 V. O.T.L.	*c.* 180 *c.* 250	1149 1300	1210 1500	Catch nil.
29	28° 09′ 30″ N. 34° 30′ 6″ E.	21.i	1000– 1030	—	N.	2	29·75	0	21·50	40·66	0 42	21·1 20·9	N. 70 V.	*c.* 180	1008	1030	
30	28° 03′ 00″ N. 34° 28′ 42″ E.	21.i	1100– 1150	—	N.	2	29·75	0 137 550	22·38 — —	40·50 40·66 40·68	0 42	21·9 21·4	N. 70 V.	*c.* 180	1129	1150	
31	27° 53′ 24″ N. 34° 27′ 36″ E.	3.ii	1400– 1445	—	N.	1	29·6	0 137 730	22·54 — —	40·48 40·46 40·48	0 38	21·7 21·1	N. 70 V.	*c.* 180	1425	1445	

Stations 7 and 20 were planned but never worked.

Legends to Plates 22–27.

PLATE 22

FIG. 1. Aqaba looking north-east.
FIG. 2. Gezeret-el-Faraun from the south-east.

PLATE 23

FIG. 3. Looking north from the anchorage at Mualla.
FIG. 4. Hobeik.

PLATE 24

FIG. 5. Typical gulf scenery. Coast 5 miles south of Dahab.
FIG. 6. Mangrove swamps at Um Nageila.

PLATE 25

FIG. 7. Sanafir Island; Fish-eagle's nest.
FIG. 8. Tiran Island, seen from Sanafir.

PLATE 26

FIG. 9. Sherm-el-Moiya; looking north-east from the entrance.
FIG. 10. *Manihine* at anchor in Ghazulani Bay with Ras Muhammad in the distance.

PLATE 27

FIG. 11. Abandoned police post at Naweibi-el-Terabin, about 45 miles south of Aqaba.
FIG. 12. Arab fisherman using cast net.

FIG. 1. AQABA

FIG. 2. GEZERET-EL-FARAUN

FIG. 3. MUALLA

FIG. 4. HOBEIK

FIG. 5. GULF SCENERY NEAR DAHAB

FIG. 6. UM NAGEILA

FIG. 7. SANAFIR ISLAND

FIG. 8. TIRAN ISLAND